Biddeford Quadrangle, Maine

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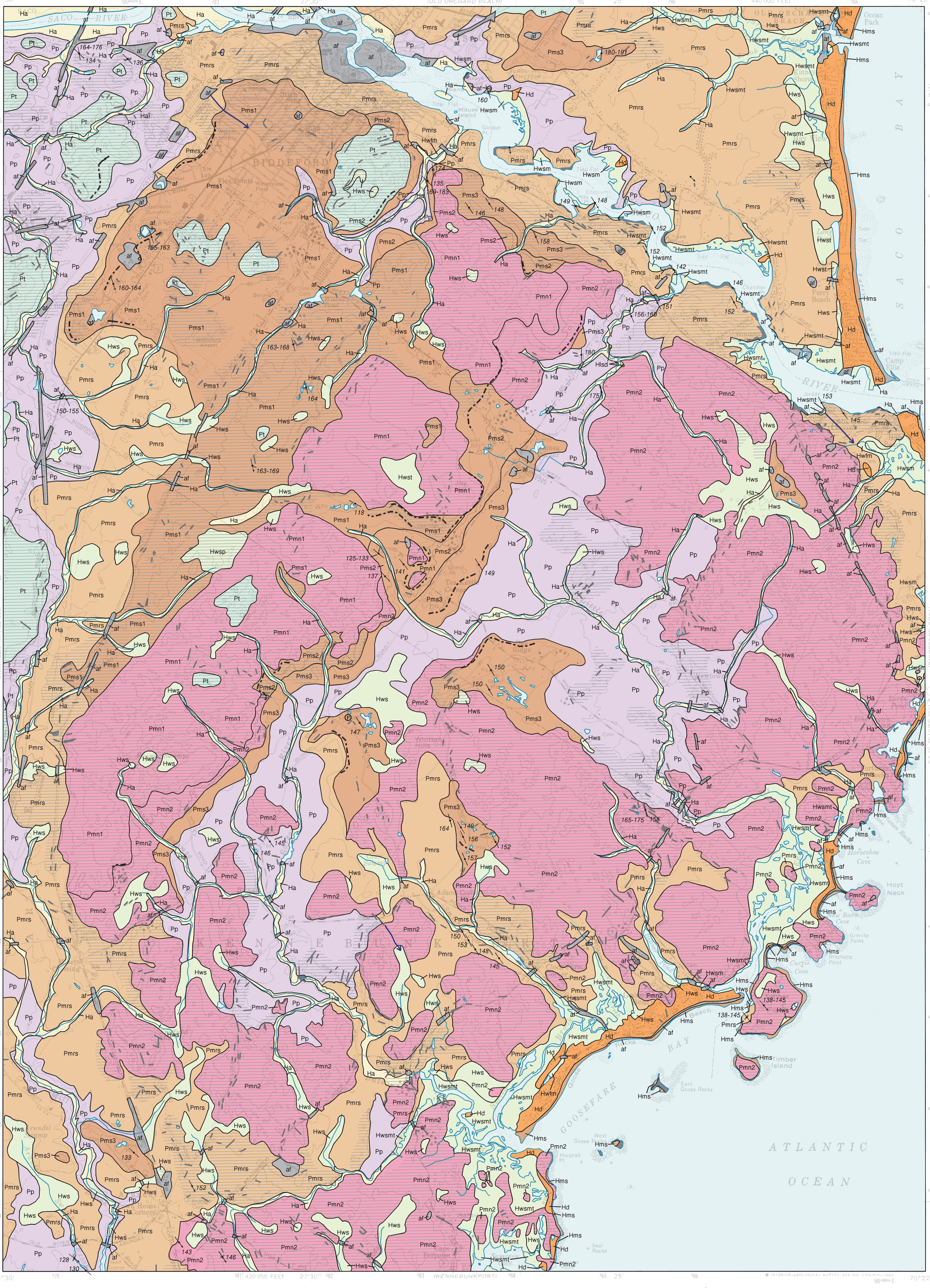
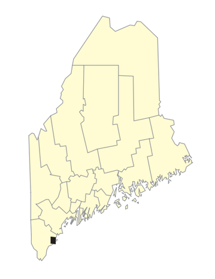
For additional information, see Open-File Report 99-109.

Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Carol T. Hildreth completed during the 1987 field season; funding for this work provided by the U. S. Geological Survey COGEOMAP program. Wetlands data provided in part by Cornelia C. Cameron, U.S. Geological Survey, 1988. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.



Quadrangle Location

SCALE 1 : 24,000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Biddeford quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

af — **Artificial fill** - Artificially emplaced materials of nearly any composition, man-made or natural; areas filled may be either man-made or natural depressions; includes dumps, landfills and areas where the surface has been so altered by construction that the natural landscape has been obliterated -- such as in city centers. Thickness variable.

Ha — **Stream alluvium** - Fine sand, silt, and clay, with some gravel and organic matter in places. Deposited in flood plains of modern streams. Extent of alluvium approximates area of potential flooding. Thickness of deposits variable. In places merges with wetlands deposits.

Hlsd — **Landslide** - Recently slumped clay-silt deposits of the Presumpscot Formation on the banks of Moors Brook where the bank is a nearly vertical cliff about 15-20 feet high; each landslide is bounded by an arcuate fault scarp about 100 feet long, and extends a maximum of about 30 to 50 feet into the cliff; the toe of each landslide is being swiftly eroded by the brook. Three such landslides were found.

Hws — **Wetland, swamp*** - Peat, silt, clay, and sand. Poorly drained area with variable tree cover, often with standing water. Thickness variable.

Hwfm — **Wetland, freshwater marsh** - Peat, silt, clay, and sand. Poorly drained freshwater grassland, often with standing water and cattails. Thickness variable.

Hwsm — **Wetland, salt marsh*** - Peat, silt, clay, and sand. Coastal marsh subject to tidal flooding and containing salt marsh grasses, 0.5 to 2m thick; where 1 m or more thick, bottom part commonly peat rich.

Hms — **Marine shoreline deposit (beach)** - Sand and/or gravel, and minor silt. Developed along the present coast. 0.5 to 5 m thick. May include sand dunes in places.

Hd — **Sand dunes** - Sand with minor silt and gravel in places. Developed primarily along the present shoreline as part of barrier beach complexes, but two small deposits were found inland. 0.5 to 5 m thick.

Pmn_{1-2} — **Marine nearshore deposits** - Thin, discontinuous deposits of sand, gravel, silt-clay, and reworked till overlying bedrock and till. Formed in shallow marine waters where glacial sediments were reworked by ocean waves and currents during regressive phase of late-glacial marine submergence. Average thickness probably less than 2 m. Subdivided into units 1 and 2 on the basis of elevation [Pmn_1 is above the 120-foot sea level stand of unit Pms_2 and Pmn_2 is below that level.]

Pms_{1-3} — **Marine shoreline deposits** - Predominantly sand and gravel. Consists of beach deposits formed during stillstands of relative sea level in regressive phase of marine submergence. Thickness variable, less that 3 m to more than 10 m. Pms_1 represents deposits that accumulated at stands of 160+ and 140+ ft, combined. Pms_2 , a stand of 120- ft; Pms_3 , combined stands of 80+ and 60+ ft; and Pms_4 (mapped only in the Biddeford Pool quad), a sea-level stand of 40- ft.

Pmrs — **Marine regressive sand deposits** - Massive to stratified and cross-stratified, well-sorted sand. Generally has gradational basal contact with Pp. Thickness 0.5 to 5 m. Deposited during regressive phase of marine submergence.

Pp — **Presumpscot Formation** - Massive to laminated, gray and blue-gray (weathering brown) silt and silty clay. Locally may contain boulders, sand, and gravel. Occurs as blanket deposit over bedrock and older glacial sediments. Variable thickness of 1-20 m. Deposited during period of late-glacial submergence.

Pt — **Till** - Gray to gray-brown poorly sorted mixture of silt, sand, pebbles, cobbles, and boulders. Forms a blanket deposit over bedrock, and is inferred to underlie younger sediments where not exposed at surface. Thin over topographic bedrock highs; thickens in topographic low areas; averages 3-5 m in thickness.

Bedrock - Rock units not distinguished. Individual outcrops not shown in areas of poor access. Ruled pattern indicates areas where surficial materials are thin (less than 1-2 m) and bedrock exposures are abundant. Areas of bedrock exposure (gray areas) are mapped in part from direct observation and in part from aerial photos.

Contact

Marine strandline - Defined by beach or base of wave-cut cliff.

Abandoned stream channel - Channel inferred to have been eroded by post-glacial stream during marine offlap. Arrow indicates inferred direction of flow.

135 — **Glacial Striation** - Includes striations, grooves, crag-and-tails and related ice-flow indicators on bedrock outcrops. Dot or center of arrow is point of observation. Arrowhead omitted where ice-flow direction is unknown. Flag indicates older trend.

Crossbeds - Arrow indicates average direction and dip of cross-bedding in glaciofluvial deposits. Tip of arrow is at point of observation.

10,150±450 (F) — **Marine fossil locality** - Indicates site where marine fossils were located.

Area of many large boulders

*NOTE: Wetland symbols followed by "t" indicate areas where peat deposits probably do not constitute a significant commercial resource, either because they are thin (< 1.5 m), or they have an ash content greater than 25 percent. Symbols followed by "p" indicate peat deposits that are thicker (generally > 1.5 m), with ash content less than 25 percent, and thus may be suitable for commercial applications.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

OTHER SOURCES OF INFORMATION

1. Hildreth, C. T., 1999, Surficial geology of the Biddeford 7.5-minute quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 99-109, 6 p.
2. Hildreth, C. T., 1998, Surficial materials of the Biddeford quadrangle, Maine: Maine Geological Survey, Open-File Map 98-183.
3. Neil, C. D., 1998, Significant sand and gravel aquifers of the Biddeford quadrangle, Maine: Maine Geological Survey, Open-File Map 98-149.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
6. Thompson, W. B., Crossen, K. J., Borns, H. W., Jr., and Andersen, B. G., 1989, Glaciomarine deltas of Maine and their relation to late Pleistocene-Holocene crustal movements, *in* Anderson, W. A., and Borns, H. W., Jr. (eds.), Neotectonics of Maine: Maine Geological Survey, Bulletin 40, p. 43-67.